Deber 3º
Estatica

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99) $AB = \langle -4{,}20, -5{,}6 \rangle$ $\quad AB = \sqrt{(4{,}20)^2 + (5{,}6)^2} = 7$

$AC = \langle 2{,}4, -5{,}6, 4{,}2 \rangle$ $\quad AC = \sqrt{(2{,}4)^2 + (5{,}6)^2 + (4{,}2)^2} = 7{,}35$

$AD = \langle -5{,}6, -3{,}3 \rangle$ $\quad AD = \sqrt{(5{,}6)^2 + (3{,}3)^2}$

$U_{AB} = \frac{\overrightarrow{AB}}{AB} = \frac{\langle -4{,}2, -5{,}6 \rangle}{7} \Rightarrow \langle -0{,}6, -0{,}8 \rangle$

$U_{AC} = \frac{\overrightarrow{AC}}{AC} = \frac{\langle 2{,}4, -5{,}6, 4{,}2 \rangle}{7{,}35} \Rightarrow \langle 0{,}32, -0{,}7, 0{,}57 \rangle$

$U_{AD} = \frac{\overrightarrow{AD}}{AD} = \langle 0, -0{,}86, -0{,}5 \rangle$

103)

AB

$\overrightarrow{AB} = \langle -36, 60, -27 \rangle$

$AB = \sqrt{-36^2 + 60^2 + 27^2} \Rightarrow 75 in$

$T_{AB} = \langle -48, 0{,}8, -0{,}36 \rangle T_{AB}$

AD

$AD = \langle 40, 60, -27 \rangle$

$\overline{AD} = \sqrt{40^2 + 60^2 + (-27)^2} = 77 in$

$T_{AD} = \langle 0{,}52, 78, -0{,}35 \rangle T_{AD}$

AC

$\overline{AC} = \langle 0, 60, 32 \rangle$

$\overline{AC} = \sqrt{60^2 + 32^2} = 68 in$

$T_{AC} = \langle 0{,}88, 0{,}47 \rangle T_{AC}$

$\Sigma F = 0$

$-0{,}48 T_{AB} + 0{,}52 T_{AD} = 0$

$\Sigma F_j = 0$

$0{,}8 T_{AB} + 0{,}78 T_{AD} + 0{,}88 T_{AC} - W = 0$

$\Sigma F_k = 0$

$-0{,}35 T_{AD} + 0{,}47 T_{AC} - 0{,}36 T_{AB} = 0$

$T_{AD} = 346 lb$

$T_{AB} = 374 lb$

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107) AB

$AB = \langle -900, -240, 380 \rangle$

$AB = \sqrt{-960^2 + (-240)^2 + 380^2} = 1060mm$

$TAB = \langle -45/53, -12/53, 19/53 \rangle$

AC

$AC = \langle -960, -240, -320 \rangle$

$AC = 1040mm$

$TAC = \langle -12/13, -3/13, -4/13 \rangle TAC$

$\Sigma F = 0$

$\Sigma F_I = 0$

$\frac{48}{53} TAB + \frac{12}{13} TAC + 240 - P = 0$

$\Sigma F_K = 0$

$-\frac{4}{13} TAC - \frac{19}{53} TAC - 55 = 0$

AD

$TAD = \langle -240, 180, -555 \rangle$

$\Sigma F_J = 0$

$\frac{12}{53} TAB + \frac{3}{13} TAC - 180 = 0$

$P = 900N$

$TAC = 342N$

$TAB = 447N$

109) $AB = \langle -45, -90, 30 \rangle$ $\overline{AB} = 105 ft$

$AC = \langle 38, -90, 65 \rangle ft$ $\overline{AC} = 115 ft$

$AD = \langle 20, -90, -60 \rangle ft$ $\overline{AD} = 110 ft$

$TAB = \frac{630}{105} \langle -45, -90, 30 \rangle \Rightarrow \langle -270, -540, 180 \rangle lb$

$TAC = \langle 0,26, -0,78, 0,57 \rangle TAC$

$TAD = \langle 0,18, -0,82, -0,55 \rangle TAD$

$\Sigma F_x = 0$

$0,26\, TAC + 0,18\, TAD = 270$

$\Sigma F_x = 0$

$-0,78\, TAC - 0,82\, TAD + P = 0$

$\Sigma F_z = 0$

$180 + 0,57\, TAC - 0,55\, TAD = 0$

$TAC = 472,72 lb$

$TAD = 817,18 lb$

$P = 1574 lb$

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III) AB

$AB = \langle -30, -480, 360 \rangle$

$AB = \sqrt{-320^2 + 480^2 + 360^2} = 680mm$

$TAB = \langle -0,47, -0,7, 0,52 \rangle TAB$

AC

$\overline{AC} = \langle 450, -480, 360 \rangle$

$|AC| = \sqrt{450^2 + (-480)^2 + (360)^2}$

$TAC = \langle 0,6, -0,64, 0,48 \rangle TAC$

AD

$TAD = \langle 0,38, -0,74, 0,553 \rangle TAD$

$\Sigma F_x = 0$

$-0,47\,TAB + 0,38\,TAD + 0,6\,TAC = 0$

$\Sigma F_y = 0$

$-1,71\,TAB - 0,74\,TAD - 0,6\,TAC + P = 0$

$\Sigma F_x = 0$

$-0,55 - 0,64\,TAC + 0,53\,TAB = 0$

$P = 845N \quad TAD = 572N \quad TAB = 544N$

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